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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE RELATIONS OF ISOSTASY TO GEODESY, GEOPHYSICS AND GEOLOGY[1]

WITHIN the past ten years geodetic observations have furnished positive proof that a close approximation to the condition called isostasy exists in the earth and comparatively near its surface.

Let the depth within which isostasy is found be called the depth of compensation. Think of a prismatic column which has for its base a unit area of the horizontal surface which lies at the depth of compensation, which has for its edges vertical lines, and has for its upper limit the actual irregular surface of the earth (or the sea surface if the upper end of the column is in the ocean). The condition called isostasy is defined by saying that the masses in all such columns are equal.

Fig. 1 (p. 202) represents two such columns. Column A is under the land and column B is adjacent to it under the ocean. If the condition called isostasy exists in two such columns having equal bases they have equal masses. Note that if this is true the average density in column A must be less than the average density in column B, for the volume of column A is greater than that of column B. This may be partially expressed by the statement that each excess of mass represented by material lying above sea level is compensated for by a

[1] Address of retiring vice-president of Section D (Mechanical Science and Engineering) of the American Association for the Advancement of Science, at Minneapolis, December 29, 1910, by John F. Hayford, director, College of Engineering, Northwestern University, Evanston, Ill.